

## REMARKS

Reconsideration is respectfully requested in light of the foregoing amendments and remarks which follow.

Claims 7, 8 and 13-18 are pending. Claims 17 and 18 have been added and are directed to a species embodiment not claimed separately before. The experiments in the previously submitted Rule 132 deal with the use of potassium as the dopant and with silica as the metal (metalloid) oxide.

Claims 8 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangold et al (JP 2000-169132) in view of Wypch (Chapter 6 of the Handbook of Fillers, second edition), Herzig (US 4,101,499), Penneck (US 4,001,128) and Cyprien Guy et al. (US 4,866,661). Applicants respectfully traverse.<sup>1</sup>

### Claims 8, 13 and 15

Claim 15 is directed to a surface-modified, aerosol doped-pyrogenically produced oxides. The dopants are specified as cerium, aluminum, potassium, their salts or their oxides. The pyrogenically produced oxides are selected from SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, ZnO, Fe<sub>2</sub>O<sub>3</sub>, Nb<sub>2</sub>O<sub>5</sub>, V<sub>2</sub>O<sub>5</sub>, WO<sub>3</sub>, SnO<sub>2</sub> or GeO<sub>2</sub>. The surface modification is a hydrophobic surface prepared by spraying the pyrogenic oxides with one or more compounds selected from octyltrimethoxysilane (Si 108), hexamethyldisilazane (HMDS), polydimethylsiloxane (PDMS) and  $\gamma$ -aminopropyltriethoxysilane (AMEO). (Claim 13 specifies the dopant of claim 15 as aluminum oxide and the pyrogenically produced oxide as silica. New claim 17 specifies the dopant of claim 15 as potassium and the pyrogenically produced oxide as silica.)

Mangold et al. teach a hydrophilic, pyrogenically produced silicon dioxide doped with aluminum oxide suitable for use in the production of inkjet paper or films. It is characterized as being readily dispersible in polar media, such as water. See paragraph [007]. Other uses are

---

<sup>1</sup> Applicants' comments are based on U.S. Published Application No. 2003/0185739. A request for the translation identified in a previous office action was made but was never supplied by the Office.

mentioned in paragraph [0015].

Wypch (Chapter 6 of the Handbook of Fillers, second edition) is a general text dealing with fillers. The Examiner's description of the material relied upon is accurate.

Herzig (US 4,101,499) teaches a process for the homogeneous distribution of highly dispersed active fillers with a BET surface area of at least  $50\text{m}^2/\text{g}$  in polyorganosiloxanes. The silica surface is modified with organosilicon compounds, e.g. hexamethyldisilane. See col.4 and 5.

Penneck (US 4,001,128) teaches a filler system for polymers which provides high voltage insulation. The filler system utilizes a combination of alumina trihydrate and a chemically treated silica fiber. The chemically treated fillers are prepared by treating inorganic silicon containing filler with one or more silanes, e.g. octamethyl tetracyclosiloxane. See col. 2 and 3. A monolayer is formed. Porosity is reduced or eliminated. AEROSIL R972 is mentioned.

Guy et al. (US 4,866,661) teach a heat-vulcanized silicon dosage form. The composition makes it possible to distribute (release) a controlled and measured amount of iodine to treat deficiencies. See col. 2. Reinforcing silica fillers are taught. For the purposes of the patent the silicas can be incorporate as such or treated with silanes prior to incorporation. Pyrogenic silica is mentioned See col. 8.

To fall within the description provided by claim 15, the Mangold et al product has to be modified so that it has a silanized surface (hydrophobic surface) and rendered suitable for use as a filler in an organic medium, e.g. silicone polymer. Mangold et al teach and desire a hydrophilic surface for their doped product. A hydrophobic surface is not compatible with the use taught for the alumina doped product.

The surface modifying agent(s) described by claim 15 are at least one of octyltrimethoxysilane (Si 108), hexamethyldisilazane (HMDS), polydimethylsiloxane (PDMS) and  $\gamma$ -aminopropyltriethoxysilane (AMEO). To arrive at the product described by claim 15 one would have to select one of the four silanes. The secondary references relied upon by the Examiner for guidance to make such a selection are not directed to inkjet applications. The more "relevant" secondary references do mention silanized silica fillers for use in silicone rubber

applications. It is not clear why an ink jet suitable alumina doped silica (hydrophilic surface) would be modified in such a fashion. A hydrophilic surface is desired. Motivation for the change in surface type is clearly lacking. The existence of a reaction of hydroxyl groups present on a silica surface is not at issue. (There is no dispute that there are sweeping utility statements in paragraph [0015] of the Mangold et al. patent but none identify alumina doped silica as a filler to be used in silicone rubber.)

In claim 15, the dopant can be one of three metals. The Rule 132 declaration shows where potassium is the dopant the filler of the invention can be used at high concentrations not possible with nonsilanized doped silicas. There are other attendant advantages mentioned in the declaration. What is at issue here, is not that one can silanize a silica surface. A variety of reactions exist and are known. What is at issue here is the absence of the needed guidance and motivation to select a potassium, alumina, or cerium doped metal oxide and to silanize it to permit its use as a filler in a silicone rubber system. It may well be that the Examiner knows of a more suitable primary reference that provides the requisite teaching. If that is the case, its substitution for Mangold et al is respectfully requested.

#### Claim 17

With regard to new claim 17, which is more closely directed to the reactants employed in the previously submitted, there are some additional selections that need to be made- silica as the metal (metalloid) oxide and potassium as the dopant. Not all dopants and metal oxides function the same. It is not expected that the Examiner disagrees with this. Note US 6,855,635 B2, US 6,676,719 B2, US 6,328,944, US 2008/0311291 A1, and US 2009/0087496 A1 show there are differences. There is no equivalency teaching of record as to aluminum and potassium. It is not seen that one suggests the substitution of the other.

Withdrawal of the rejection is respectfully requested. The art is insufficient to establish a proper prima facie case.

Further, Applicants have previously provided a Rule 132 declaration which establishes, from the Declarant's perspective, unexpected results. In rebuttal, the Examiner suggests that the

cited six patents establish the results to be expected.<sup>2</sup> None of the documents mention doped, surface modified pyrogenically produced oxides. Their probative value is not clear since the products discussed are not closely related to those claimed and the factors which lead to the improvements are varied. It is agreed that the patents show the prior existence of certain traits. The quality and quantity of the traits and their sole assignment to a particular factor uncertain. Further, the improvements demonstrate show variation and involvement of many possible factors. Patents were issued in a highly competitive art. Caradori et al. (US 6,288,1430) mentions “tear resistance”. Eguchi et al (US 5,739,199) show an optically transparent organosiloxane resin composition. Bergstrom et al. (US 6,384,125) show improvements in tear resistance. Burns (US 6,051,672) show improvements in aggregation. Canpont (US 6,462,104) shows improvements in tear strength. Lutz et al. (4,344,800) show improvement in tear resistance and tensile strengths.

In light of this, it is not seen why the observations of the Declarant, one skilled in the art, would be questioned in light of patents directed to different silica material. The results shown are clearly commensurate in scope with the newly submitted claims 17 and 18. These results would rebut a prima facie case. Dopants affect the silica surface and particle composition and create some uncertainty.

Claim 7, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangold et al (JP 2000-169132) in view of Wypch (Chapter 6 of the Handbook of Fillers, second edition), Herzig (US 4,101,499), Penneck (US 4,001,128) and Cyprien Guy et al. (US 4,866,661) and also in view of Lentz (US 3,122,520). Applicants respectfully traverse.

Mangold et al (JP 2000-169132), Wypch (Chapter 6 of the Handbook of Fillers, second edition), Herzig (US 4,101,499), Penneck (US 4,001,128) and Cyprien Guy et al. (US 4,866,661) are discussed above.

Lentz teaches silanization of silica prior to use as a reinforcing filler silicone rubber. The silanized silica increase tensile strength. An operable surface area range for the silica is taught.

---

<sup>2</sup> The patents include US 6,288,143 (Cardori et al), US 5,739,199 (Eguchi et al.), US 6,384,125 (Bergstrom et al.)

See col. 2 and 3. Fume silicas are mentioned. Suitable organosilanes are taught in col. 4. The preparatory process is taught in the Examples and in col. 2-3. The essential steps appear to be heating a silica hydrosol under strong acid conditions (pH 0, .3, 1.7) prior to reacting the gel with the organosilicon compound.

Claims 7, 14, and 16

Claim 16 describes a three step process for producing an aerosol doped, surface-modified pyrogenically produced oxides. The steps include placing aerosol doped-pyrogenically produced oxides, having a BET surface area between 40 and 217 m<sup>2</sup>/g and dopant homogeneously distributed within the pyrogenically produced oxide, in a suitable mixing container, spraying the oxides with water and/or acid and then spraying the oxides under intensive mixing with the surface-modification reagent or a mixture of several surface-modification reagents under conditions where oxygen is excluded, to form the aerosol doped, surface-modified, pyrogenically produced oxides. The dopants are cerium, aluminum, potassium, or salts or oxides thereof. The metal (metalloid) oxides are SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, ZnO, Fe<sub>2</sub>O<sub>3</sub>, Nb<sub>2</sub>O<sub>5</sub>, V<sub>2</sub>O<sub>5</sub>, WO<sub>3</sub>, SnO<sub>2</sub> or GeO<sub>2</sub>. The surface modifying reagent is octyltrimethoxysilane (Si 108), hexamethyldisilazane (HMDS), polydimethylsiloxane (PDMS) or  $\gamma$ -aminopropyltriethoxysilane (AMEO). Claim 7 further specifies the presence of a re-mixing step where the surface modification agent(s) and the aerosol doped, surface-modified, pyrogenically produced oxides are mixed for 15 to 30 minutes and tempering at a temperature of 100 to 400°C for a period of 1 to 6 hours. Claim 14 specifies the dopant as aluminum oxide and the pyrogenically produced oxide as silica. New claim 18 specifies the dopant as potassium oxide and the pyrogenically produced oxide as silica.

Mangold et al simply does not teach the process as claimed. This not surprising since silanization is not envisioned or desired for their ink jet application.

---

and US 6,051,672 (Canpoint) and US 4,344,800 (Lutz et al).

Lentz et al. does teach a silanization process. A two step process which is not remotely like that claimed and employs rather severe conditions.

It is not clear how the other secondary references are applied to suggest the modification of the Lentz et al process. Mangold et al. is clearly silent in that regard.

There is no suggestion in the record that the reaction of the hydroxyl groups on the surface of silica with silanes is new. Hydrophobizing silica is not a new concept. The presence of these facts do not permit one to allege the presence of a prima facie case when the art does not lead one to step sequence and type.

Claim 7 includes remixing and tempering steps. These steps are not envisioned by Lentz et al.

#### Claim 18

With regard to new claim 18, which is more closely directed to the reactants employed in the previously submitted Rule 132 Declaration, there are some additional selections that need to be made- silica as the metal (metalloid) oxide and potassium as the dopant. Not all dopants and metal oxides function the same. It is not expected that the Examiner disagrees with this. Note US 6,855,635 B2, US 676,719 B2, US 6,328,944, US 2008/0311291 A1, and US 2009/0087496 A1. There is no equivalency teaching as to aluminum and potassium. It is not seen that one suggests the substitution of the other.

Withdrawal of the rejection is respectfully requested. The art is insufficient to establish a proper prima facie case.

Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hemme et al. (US App. 2002/0018741) in view of Wypch (Chapter 6 of the Handbook of Fillers, second edition), Herzig (US 4,101,499), Penneck (US 4,001,128) and Cyprien Guy et al. (4,866,661). Applicants respectfully traverse.

Hemme et al teach a pyrogenically produced titanium dioxide doped by means of an aerosol. The dopants include, aluminum oxide, platinum oxide, magnesium oxide, and zinc oxide. Titanium oxide is used as a photocatalyst or UV absorber. There is no mention of surface modification treatment to render a hydrophilic surface hydrophobic. There is mention of a use in plastics or coatings. See paragraphs [0023] and [0024]. The exemplified uses are in aqueous or acidic environments. Hemme et al. do not teach a use as a reinforcing filler.

The secondary references do not remedy the deficiencies of the primary reference. Accordingly, the teachings of the references, taken alone or in combination, are incomplete to suggest the invention as claimed.

The examiner appears to be of the opinion that the mere showing of the existence of specified chemical reactions renders their application in a specified manner “obvious”.

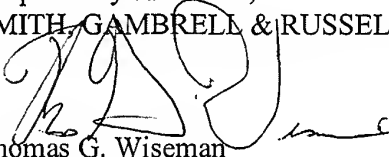
A proper prima facie case of obviousness has not been established. Withdrawal of the rejection is respectfully requested.

### CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Therefore, it is respectfully requested that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. However, in the event that additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. 1.136(a), and any fees required therefor are hereby authorized to be charged to **Deposit Account No. 02-4300, Attorney Docket No. 032301.606.**

Respectfully submitted,  
SMITH, GAMBRELL & RUSSELL, LLP



Thomas G. Wiseman  
Reg. No. 35,046

Date: November 13, 2009

1130 Connecticut Ave., NW, #1130  
Washington, D.C. 20036  
Telephone: (202) 263-4300  
Facsimile: (202) 263-4329

SGRDC\354189.1